RECEIVED
CENTRAL FAX CENTER
MAR 15 2007

REMARKS

Applicants appreciate the Examiner's thorough examination of the subject application and request reconsideration of the subject application based on the foregoing amendments and the following remarks.

Claims 1-25 are pending in the subject application.

Claims 1-25 stand rejected under 35 U.S.C. §101, 35 U.S.C. §103, and/or 35 U.S.C. §112, second paragraph. Claims also were objected to because of identified informalities.

In this regard, Applicants would note that claims 2-3, 5-6, 8-9, 14-15, and 18-20 were not rejected on prior art grounds, thus Applicants assume that these claims would be allowable if the non-art based rejections were overcome. If not, then Applicants respectfully submit that above-referenced Office Action is incomplete and therefore the next action on the merits should be a non-final action.

Claim 1 was amended so that the system claim embodies means plus function language instead of the specific element format type of language. While a claim in the means plus function format might be considered as being inaccurate since only a single means (a computer) actually performs all functions, this type of claim has been sanctioned by the courts. In addition, claim 1 was amended to explicitly provide that the one or more gear characteristics are being outputted under certain circumstances.

Claims 2-3, 10-12 and 18 were amended to be consistent with the means plus language format of claim 1.

Claim 4 was amended to describe the purpose of the program, that the program is executed on a computer and also that the program being so executed carries out the steps as set forth in the claim. In, addition claim 3 was amended to explicitly provide that the one or more gear characteristics are being outputted under certain circumstances.

Claim 5 was amended to address the objections noted by the Examiner.

Claim 7 was amended to provide that the claimed method is being executed by a computer. Claim 7 also was amended to address the objections noted by the Examiner.

Claim 8 was amended for clarity and to resolve possible objections.

Claim 13 was amended to address the §112, second paragraph rejections and to include the limitations of claim 17 so that claim 13 explicitly provides that the one or more gear characteristics are being outputted under certain circumstances.

Claim 14 was amended to exclude the instructions and criteria language in the claims when used to further limit one of the claimed program instructions and criteria as it appears that such language is objectionable to the Examiner except when it is specifically used to further limit the instructions and criteria for the program. In addition claim 14 was amended to address the other objections noted by the Examiner as well as the §112, second paragraph rejections.

Claim 17 was amended so as to depend form claim 16 and also so as to be consistent with the language of claim 16.

Claims 18 and 19 were amended to address the §112, second paragraph rejections and also to revise the claim from which these claims are dependent.

Claim 20 was amended to address the §112, second paragraph rejections and also to exclude the instructions and criteria language in the claim as is being used to further limit one of the claimed program instructions and criteria which appears to be objectionable to the Examiner as described above. Also the dependency of claim 20 was revised.

Claim 21 was amended so as to address the objections noted by the Examiner.

The amendments to the claims are supported by the originally filed disclosure.

35 U.S.C. §112, SECOND PARAGRAPH REJECTIONS

Claims 13-15 and 18-20 stand rejected under 35 U.S.C. §112 on the grounds that there are antecedent basis, indefiniteness and/or vagueness concerns with the identified claims. It is presumed that claim 15 stands rejected because of the dependency from claim 14 (*i.e.*, a rejected claim with an identified concern).

As indicated above, Applicants amended each of claims 13-14 and 18-20 so as to address the identified concerns. Applicants thus believe that the areas of rejection have been identified and addressed in the foregoing amendment.

It is respectfully submitted that claims 13-15 and 18-20 thus satisfy the requirements of 35 U.S.C. §112 and, therefore, are in a condition for allowance.

CLAIM OBJECTIONS

In the above-referenced Office Action, claims 5, 7, 14 and 21 were objected to because of identified informalities. Applicants respectfully traverse.

As provided above, each of claims 5, 7 and 21 were amended so as to address the objections noted by the Examiner.

As to claim 14, the objection directed to lines 8-10 was addressed in the foregoing amendment; however, the objection to the language in line 2 was not addressed in the manner suggested by the Examiner. This language in claim 14 was intending to provided that the claimed instructions and criteria feature "simulating an oscillation" of claim 13 also included the instructions and criteria recited in claim 14. Thus, the instructions and criteria in claim 14 were essentially further limiting the claimed instruction and criteria feature "simulating an oscillation" of claim 13.

Therefore as it appeared that the use of "instructions and criteria" language in connection with further limiting the claimed feature "simulating an oscillation" was objectionable to the Examiner, Applicants revised claim 14 to indicate that the claimed instructions and criteria feature "simulating an oscillation" included the language that followed.

In view of the foregoing amendments and comment, Applicants believe that the objection noted by the Examiner have been overcome and thus the identified claims are considered to be in acceptable form.

35 U.S.C. §101 REJECTIONS

Claims 1-25 stand rejected under 35 U.S.C. §101 as provided on the pages 5-10 of the above-referenced Office Action. In particular, it asserted that these claims are not directed to statutory subject matter but rather are directed to computer programs per se, that the claim does not produce any useful, tangible and concrete result (*i.e.*, lacks practical application) and/or only includes features/elements that can be implemented by paper and pencil. Applicants respectfully traverse.

Before turning to the claim language reference is first made to the guidelines provided in the MPEP as to patentable subject matter for computer related inventions generally provided in MPEP – 2106, 2106.1. As provided in the MPEP

> Computer programs are often recited as part of a claim. Office personnel should determine whether the computer program is being claimed as part of an otherwise statutory manufacture or machine. In such a case, the claim remains statutory irrespective of the fact that a computer program is included in the claim. The same result occurs when a computer program is used in a computerized process where the computer executes the instructions set forth in the computer program. Only when the claimed invention taken as a whole is directed to a mere program listing, i.e., to only its description or expression, is it descriptive material *per se* and hence nonstatutory.
>
> Since a computer program is merely a set of instructions capable of being executed by a computer, the computer program itself is not a process and Office personnel should treat a claim for a computer program, without the computer-readable medium needed to realize the computer program's functionality, as nonstatutory functional descriptive material. When a computer program is claimed in a process where the computer is executing the computer program's instructions, Office personnel should treat the claim as a process claim. See paragraph IV.B.2(b), below. When a computer program is recited in conjunction with a physical structure, such as a computer memory, Office personnel should treat the claim as a product claim. See paragraph IV.B.2(a), below.

The MPEP also provides that if a claim is directed to a machine and the physical structure of the machine is defined in terms of its hardware or hardware and software combination, it defines a statutory product. As more particular provided in the MPEP:

> If a claim defines a useful machine or manufacture by identifying the physical structure of the machine or manufacture in terms of its hardware or hardware and software combination, it defines a statutory product. See, e.g., *Lowry*, 32 F.3d at 1583, 32 USPQ2d at 1034-35; *Warmerdam*, 33 F.3d at 1361-62, 31 USPQ2d at 1760.

The following excerpt from the MPEP also provides insight into claiming programs embodied in computer readable media, such as computer memory and floppy disks.

> Descriptive material can be characterized as either "functional descriptive material" or "nonfunctional descriptive material." In this context, "functional descriptive material" consists of data structures and computer programs which impart functionality when employed as a computer component. (The definition of "data structure" is "a physical or logical relationship among data elements, designed to support specific data manipulation functions." The New IEEE Standard Dictionary of Electrical and Electronics Terms 308 (5th ed. 1993).) "Nonfunctional descriptive material" includes but is not limited to music, literary works, and a compilation or mere arrangement of data.
> Both types of "descriptive material" are nonstatutory when claimed as descriptive material *per se*, 33 F.3d at 1360, 31 USPQ2d at 1759. When functional descriptive material is recorded on some computer-readable medium, it becomes structurally and functionally interrelated to the medium and will be statutory in most cases since use of technology permits the function of the descriptive material to be realized. Compare *In re Lowry*, 32 F.3d 1579, 1583-84, 32 USPQ2d 1031, 1035 (Fed. Cir. 1994)(discussing patentable weight of data structure limitations in the context of a statutory claim to a data structure stored on a computer readable medium that increases computer efficiency) and *Warmerdam*, 33 F.3d at 1360-61, 31 USPQ2d at 1759 (claim to computer having a specific data structure stored in memory held statutory product-by-process claim) with *Warmerdam*, 33 F.3d at 1361, 31 USPQ2d at 1760 (claim to a data structure *per se* held nonstatutory).

A copy of In re Lowry and In re Beauregard both dealing with programs stored on recordable media is enclosed herewith.

Claims 1-3, 10-12 & 18

In regards to the rejection of these claims, Applicants would note that as a general principle terms used in the claims are given there customary and ordinary meaning consistent with the usage in the specification unless a special meaning is provided in the specification. Applicants have enclosed herewith a definition for "system" and "section" that were both obtained from an on-line dictionary (Merriam-Webster's Online Dictionary, 10th Edition). It is clear from the subject application as well as the definitions included herewith, that a "system for designing a gear driving system" and the sections making up such a system cannot be the equivalent to a paper and pencil. Such an assertion clearly is wholly inconsistent with the meaning of these words.

However, notwithstanding this and as indicated above, claims 1-3 were amended so as to claim a system for designing a gear driving system in which the features of the claims are set forth in means plus function language instead of using the section language. While a claim in the means plus function format might be considered as being inaccurate since only a single means (a computer) actually performs all functions, this type of claim has been sanctioned by the courts.

As to the assertion that the claimed invention does not produce any useful, tangible and concrete result (*i.e.*, lacks practical application), Applicants respectfully disagree. As it s clear from reading the entirety of claim 1, one or more gear characteristic values are set in the setting means and the calculation means, using these one or more gear characteristic values simulates an oscillation in the final gear of the gear driving system. The judging means that judges whether or not the simulated oscillation is within an acceptable range and if not the setting changing means changes one or more the set gear characteristic values.

As is clear from the subject application and as set forth in the preamble of the claim, the system is for designing a gear driving system. It also is clear from the subject application and from the claim language that such a gear driving system has or is defined by one or more gear characteristic values. It also is clear from the subject application and inherent from the claim language, that the result of the claimed system is to arrive at one or more gear characteristic

values for the gear driving system which would yield a gear driving system in which an oscillation in the final gear would be in an acceptable range. It is respectfully submitted that such one or more gear characteristic values for the gear driving system is clearly a useful, tangible, and concrete result of the claimed system.

Notwithstanding the foregoing, Applicants have amended claim 1 to explicitly provide that such a result is outputted when the judging section determines that the simulated oscillation is within the acceptable range.

The foregoing remarks apply especially for claim 11, which provides that the system includes an output means for outputting the one or more gear characteristic values.

In view of the foregoing remarks, it is respectfully submitted that claims 1-3 and 18 are not directed solely to a computer program and do provide a useful, tangible and concrete result.

Claims 4-6 & 23

As requested by the Examiner, the preamble of claim 4 was amended so as to describe a purpose for the program and that the program is being executed on a computer, which Applicants believe satisfy the concerns raised in the rejection.

As to the assertion that the claims do not provide a useful, tangible and concrete result, Applicants refer the Examiner to the foregoing remarks regarding claim 1 and the amended language of claim 1, which also applies to overcome this assertion directed to claim 4 and the claims dependent therefrom.

In view of the foregoing remarks, it is respectfully submitted that claims 4-6 and 23 are not directed solely to a computer program and do provide a useful, tangible and concrete result.

Claims 7-9, 19 & 24

Claim 7 was amended so as to provide that the method is executed by a computer, which amendment is believed to overcome the Examiner's concerns.

As to the assertion regarding the lack of a useful, tangible and concrete result, the Office Action provides that this result is lacking because the claim "only sets characteristic values of the final and driving gears and outputs them on paper." In this regard, Applicants respectfully submit that there is nothing in the law or rules directed to the useful, tangible and concrete result in which the manner of output has a bearing on whether the result is useful, tangible, and concrete. It is clear that outputting one or more gear characteristic values corresponding to the simulated oscillation be judged *as optimum gear characteristic values* when the simulated oscillation in the final gear being judged, is judged to fall within the acceptable range, is both concrete and tangible. Also, as these outputted characteristics can be used in the construction of the gear driving system, the result also is useful.

In view of the foregoing remarks, it is respectfully submitted that claims 7-9, 19 and 24 are not directed solely to a computer program and do provide a useful, tangible and concrete result.

Claims 13-17 & 20

As indicated in the discussion above regarding the law relating to statutory subject matter and in view of the decision of the Board in *In re Beauregard*, computer programs embodied in a tangible medium (*e.g.*, floppy disks, computer storage memory) **are patentable subject matter under 35 USC §101.**

As to the assertion that the claims do not provide a useful, tangible and concrete result, Applicants refer the Examiner to the foregoing remarks regarding claims 1 and 7, which also apply to overcome this assertion directed to claim 13 and the claims dependent therefrom.

Claim 13 is directed to a computer program that is stored in one of "a static storage medium, a dynamic storage medium or a storage area of a computer system." The result of the invention of claim 13 is useful, tangible and concrete.

Thus, Applicants respectfully submit that in view of *In re Beauregard*, the rejection of claims 13-17 and 20 under 35 U.S.C. §101 is improper and thus should be withdrawn.

Claim 21

The Office Action asserts that claim 21 is not statutory because it does not claims a computer program stored on a computer readable memory or implemented on a computer memory, which when executed on a computer performs a process.

Applicants would direct the Examiner to again read the preamble of claim 21 which explicitly provides that Applicants are claiming a program for designing a gear driving system *in combination with a computer* and that the program is for execution on *the computer* and comprises the instructions and criteria set forth in the claim. In sum, the claim includes a computer, which structure element apparently was ignored when arriving at the within rejection.

As to the assertion that the claims do not provide a useful, tangible and concrete result, Applicants refer the Examiner to the foregoing remarks regarding claims 1 and 7, which also apply to overcome this assertion directed to claim 21.

Claim 21 is directed to a computer program in combination with a computer. The result of the invention of claim 21 is useful, tangible and concrete.

Thus, Applicants respectfully submit that the rejection of claim 21 35 U.S.C. §101 is improper and thus should be withdrawn.

Claim 25

As indicated in the discussion above regarding claim 13 computer programs embodied in a tangible medium (*e.g.*, floppy disks, computer storage memory) **are patentable subject matter under 35 USC §101.**

As to the assertion that the claim 25 does not provide a useful, tangible and concrete result, Applicants refer the Examiner to the foregoing remarks claim 4, which also apply to overcome this assertion directed to claim 25.

Claim 25 is directed to a computer readable storage medium for storing a computer program according to claim 4. The result of the invention of claim 25 is useful, tangible and concrete.

Thus, Applicants respectfully submit that in view of *In re Beauregard*, the rejection of claim 25 under 35 U.S.C. §101 is improper and thus should be withdrawn.

In view of the foregoing remarks, it is respectfully submitted that claims 1-25 are not directed solely to a computer program and do provide a useful, tangible and concrete result. Thus, claims 1-25 are each directed to statutory subject matter and therefore satisfy the requirements of 35 USC §101.

35 U.S.C. §103 REJECTIONS

Claims 1, 4, 7, 10-13, 16, 17 and 21-25 stand rejected under 35 U.S.C. §103 as being unpatentable over Sumida [US Patent Publication No. 2003/0115037] in view of Koide [US Patent Publication No. 2002/0085086] and further in view of Hsi Lin et al. ["A parametric study of spur gear dynamics;" "Hsi Lin"] for the reasons provided on pages 11-18 of the above-referenced Office Action. Applicants respectfully traverse as discussed below. Because claims amended in the instant amendment, the following discussion refers to the language of the amended claims. However, only those amended features specifically relied upon to distinguish the claimed invention from the cited prior art shall be considered as being made to overcome the cited reference.

In generally broad aspects the present invention features a method for designing a gear driving system that includes the following

setting one or more gear characteristic values for a gear driving system;

simulating an oscillation in a final gear of the gear driving system, based on the one or more set gear characteristic values;

judging whether or not the simulated oscillation in the final gear is within an acceptable range;

changing any one or more of the one or more gear characteristic values previously set, when said judging judges that the simulated oscillation in the final gear does not fall within the acceptable range; and

outputting the one or more gear characteristic values corresponding to the simulated oscillation so judged to be within the acceptable range, when said judging judges that the simulated oscillation in the final gear is within the acceptable range.

Sumida describes a methodology for creating a simulation model that simulates operations from a component of a single function to a machine that combines many components. The overall function simulation model according to the method described in Sumida uses a plurality of function simulation models which are independently provided for predetermined functions and are coupled via potential and flow variables. The simulation model methodology described in Sumida is not directed to simulate any one type of activity and also is established so that the model can simulate functions attributable to devices or functions that are inherently different from each other (*e.g.*, mechanical and electrically based devices).

Thus, whatever the modeling methodology is described in Sumida there is no express reference in the methodology or the examples included with the methodology that are expressly directed to design of gear driving systems so as to determine if a simulated oscillation in a final gear is such as to be within or without an acceptable range.

Sumida does include discussions directed to systems or devices that embody transmissions or gearing, however, the use of these discussions is not to arrive at a gearing system design but rather these functionalities are modeled so that operation of an apparatus (*e.g.*, automobile) can be simulated.

For example, reference is made to Fig. 9 as support for generally teaching of a gear driving system. Fig. 9 shows models of internal functions of an elastically supported rigid beam and planetary gear train. The discussion in which Fig. 9 appears, includes a discussion as to how functional models modeled using linear functional elements become common ones as long as they have identical functions even in different physical systems and the mechanisms of different physical systems can replace each other. Fig. 9 is used to show how this foregoing principle applies for an elastically supported rigid beam and planetary gear train.

Reference is made to Figs. 61, 62 and 93 in support of an assertion that these figures correspond to or teach the calculating section of claim 1 for example. In contrast to the assertion, Figure 61 is described in Sumida as being a registration example of an equivalent functional model of an auto engine and Figure 62 shows an example of a a functional model of a torque converter with an LU function.

Figure 93 is a flow chart showing the processing sequence until simulation execution according to an embodiment of the invention described in Sumida. Referring to the discussion in paragraphs 973 and 974, it is clear that all step S-4 provides is that when all information needed for simulating operation of the model is available, the operation of the model is simulated on the computer. There is no express reference is this discussion that what is being simulated is an oscillation in the final gear of the gear driving system or anything specifically related to a gear driving system.

In the grounds for the rejection of claim 7, reference is made to Figs. 62, 74, 59 61, and 57 in support of an assertion that Sumida teaches outputting the one or more gear characteristics corresponding to those being judged. What is interesting in regards to this rejection, is that the Office Action admits on page 12 thereof that Sumida does not expressly teach a judging section for judging whether or not the oscillation in the final gear is within an acceptable range. Rather reference is made to the discussion in Koide which allegedly provides the missing teachings. Thus, it cannot be admitted that

Sumida does not teach judging and then assert that Sumida teaches providing an ouput from such a judging process.

In any event, as indicated above and in contrast to that asserted in the Office Action, Figure 61 in Sumida is a registration example of an equivalent functional model of an auto engine and Figure 62 shows an example of a functional model of a torque converter with an LU function. Also and in contrast to that asserted in the Office Actio, Fig. 74 shows an example of the hardware arrangement of a system according to an embodiment of the invention described in Sumida, Figure 59 shows a display example of a characteristic value definition table (*i.e.*, an input table), and Fig. 57 shows a display example of an update table of variable names of functional models.

As indicated above, Koide is relied upon for providing the missing teachings of a judging section or the judging function of the present invention. In this regard reference is made to Fig. 29 and the discussion in paragraph 0048 (the brief description of Fig. 29) and paragraph 0184 of Koide in support of the alleged teaching of a judging section.

Fig. 29 is in the discussion for the outer rotor type of coreless brushless rotor and it is noted in paragraph 00184 that the oscillation spatial frequency shown in this figure corresponds to the spatial frequency of the torque ripples represented in Eq. 32 which is an expression of the fundamental spatial frequency of a three-phase motor described prior to paragraph 0178.

The discussion in that section is directed to actions taken with regards to the motor design to minimize the motor created torque ripples. There is some discussion in paragraph 00184 regarding the oscillatory amplitude and how the amplitude of the torque ripples is related to the gear ratio. While Koide makes some generalized statements abut the gear ratio and the torque ripples, it is clear that the discussion that follows in this section of Koide is directed to the design of the motor to minimize thrust ripples. Thus, there is no indication in the discussion of the section including Fig. 29 that there is a judging of a simulated oscillation of the final gear as determined by the calculating section based on the gear characteristics of the gear driving system.

It also should be recognized that asserting that this discussion in Koide is a discussion regarding a system for designing a gear driving system and in particular judging such oscillations is inconsistent with Koide. It first should be noted that Koide describes a different procedure and mechanism for reducing oscillations ascribable to the transmission mechanism. Koide specifically provides the following.

> [0011] On the other hand, assume that a motor drives a drive roller via gears or a drive transmission belt. Then, there arise other problems including the variation of transmission speed ascribable to the eccentricity of the gears or rollers (or pulleys) holding the belt, oscillation ascribable to the gears meshing with each other, and the deterioration of the rigidity of the belt. In addition, the torque ripples of the motor, for example, are transferred to the drive roller while being amplified by a speed reduction ratio between the gears or the rollers.
>
> [0012] In light of the above, Japanese Patent Laid-Open Publication No. 10-63059, for example, proposes to use a gear train for reducing the output speed of a motor and to mount a large flywheel on the shaft of a photoconductive drum, thereby reducing oscillation ascribable to a transmission system. Although this kind of scheme reduces high-frequency oscillation ascribable to, e.g., the gears, it cannot reduce speed variation ascribable to the eccentricity of the gears or effect accurate control due to the deterioration of the rigidity of the driveline.
>
> [0161] It has been customary to use a gear train, belt or similar speed reduction mechanism connected to a motor and to mount a large flywheel on a drive roller or on the shaft of a photoconductive drum, as taught in Laid-Open Publication No. 10-63059 discussed earlier. This configuration reduces oscillation ascribable to the transmission mechanism and increases motor efficiency. However, the transmission mechanism introduced in the driveline

involves the deterioration of rigidity and eccentricity, making accurate control for constant rotation difficult.

[0190] Thrust ripples appear even in the case of the trapezoidal waveforms shown in FIG. 33. However, in FIG. 33, currents are not fed to the three coil phases at the same time, but are fed independently of each other. This, coupled with the fact that the current switching time between the phases is made as short as possible, realizes a motor that is efficient and suffers from a minimum of thrust ripples.

In addition, and as can been seen in each of the motor arrangements shown in Figures 20-24 the motor driving the drive roller is a is an outer rotor type of motor that is used in a direct rive system where the motor is directly connected to the drive roller (*i.e.*, no transmission in between the motor and drive roller).

In other words, in Koide the discussion concerning Fig. 29 is in regards to a motor that is directly coupled to the drive roller 3 or the photoconductive drum 5. Thus, the discussion is directed to a direct drive system which would not embody a transmission system. Thus, the discussion being referred to teaches away from a methodology that embodies simulating a oscillation in a final gear and judging from the simulated oscillation whether or not the simulated oscillation is within an acceptable range and changing one or more gear characteristic values in the case where this is not the case.

In sum, Koide does not describe a judging section and the teachings being relied upon for such an alleged functionality appears to be directed to a direct drive system in which the drive roller is directly coupled to the outer rotor type of motor.

Applicants also would note that the motivation for combining the references is that one skilled in the art would have made obvious to one skilled in the art to make the suggested combination because it would allow using a gear train configuration that reduces oscillations in the transmission system.

As indicated above, Sumida does not include any teaching of a judging section and thus there cannot be any teaching or suggestion therein to make the suggested combination. Also, there is no description anywhere in Koide of a system for designing a gear driving system or any advantages that could flow to such a design system. While the Examiner refers to Fig. 29, this figure in of itself and the related discussion in Koide do not include any teaching or suggestion to modify an extant system for designing a gear driving system so as to include judging the simulated oscillation to see it is within an acceptable range. This is particularly the case when one realizes the discussion that includes Fig. 29 is directed to a direct drive system. In sum, absent Applicants disclosure no one skilled in the art would have been motivated to even consider combining teachings of the two cited references.

As to the tertiary reference Hsi Lin, this reference is being used for the limited purpose of allegedly teaching the use of a setting changing section for changing the previously set one or more gear characteristic values. Therefore, the disclosure of His Lin does not overcome the shortcomings described above regarding the primary and secondary references.

The motivation asserted in the Office Action for making this tertiary combination is because that would allow the gear designer to choose optimum values of gear parameters when designing a gear train system for minimum oscillations. It first should be noted that the language in the article apparently being referred to indicates that the availability of the information from the parametric study can help a gear designer choose the optimum value of gear parameters for minimizing load and stress.

In any event, there is no suggestion anywhere in His Lin that the parametric study suggests or teaches that a setting changing section or related function would be reasonably successful if combined with other design related functions of a system,, method, etc for designing a gear driving system. Absent Applicants teachings there would have been no motivation for one skilled in the art to consider combining the

teachings of both Koide and His Lin with the modeling methodology described in Sumida as well as there being no suggestion, disclosure or teaching that such a combination of the secondary and tertiary references in the suggested manner would have been reasonably successful.

Further, the use of the invention of the subject application reduces a banding phenomenon (especially when the banding phenomenon occurs in a photoreceptor or a developer tank, a printing unevenness called "pitch unevenness" occurs in the printed image; see page 2, paras 3 and 4 of the subject application), caused when a gear is driven to be rotated. This thereby improves image quality. None of the references cited in support of the grounds for rejection exhibits such an effect.

As provided in the MPEPs, obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. *In re Fine*, 837 F. 2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); *In re Jones*, 958 F. 2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). As provided above, the references cited, alone or in combination, include no such teaching, suggestion or motivation.

Furthermore, a prior art reference can be combined or modified to reject claims as obvious as long as there is a reasonable expectation of success. *In re Merck & Co., Inc.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 19866). Additionally, it also has been held that if the proposed modification or combination would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious. Further, and as provided in MPEP-2143, the teaching or suggestion to make the claimed combination and the reasonable suggestion of success must both be found in the prior art, not in applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). As can be seen from the forgoing discussion regarding the disclosures of the cited references, there is no reasonable expectation of success provided in any of the references.

As the USPTO Board of Patent Appeals and Interferences has held, "The mere fact that a worker in the art could rearrange the parts of the reference device to meet the terms of the claims on appeal is not by itself sufficient to support a finding of obviousness. The prior art must provide a motivation or reason for the worker in the art, without benefit of appellant's specification, to make the necessary changes in the reference device." *Ex parte Chicago Rawhide Mfg. Co.*, 223 USPQ351, 353 (BD. Pat. App. & Inter. 1984).

As the Federal circuit has stated, "[t]he mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification." *In re Fritch*, 972 F.2d 1260,1266, 23 USPQ2d 1780, 1783-84 (Fed. Cir. 1992). Obviousness may not be established using hindsight or in view of the teachings or suggestions of the inventor. *Para-Ordance Mfg. v. SGS Importers Int'l, Inc.*, 73 F.2d 1085, 1087, 37 USPQ2d 1237, 1239 (Fed. Cir. 1995).

It is respectfully submitted that for the foregoing reasons, claims 1, 4, 7, 10-13, 16, 17 and 21-25 are patentable over the cited reference(s) and satisfy the requirements of 35 U.S.C. §103. As such, these claims, including the claims dependent therefrom are allowable.

It is respectfully submitted that the subject application is in a condition for allowance. Early and favorable action is requested.

Applicants believe that additional fees are not required for consideration of the within Response. However, if for any reason a fee is required, a fee paid is inadequate or credit is owed

for any excess fee paid, the Commissioner is hereby authorized and requested to charge Deposit Account No. **04-1105.**

Respectfully submitted,

Edwards Angell Palmer & Dodge, LLP

Date: March 15, 2007

By: _____

William J. Dalcy, Jr.
(Reg. No. 35,487)
P.O. Box 55874
Boston, MA 02205
(617) 439- 4444

Customer No. 21,874

Bos2_597282

32 USPQ2d 1031
In re Lowry
U.S. Court of Appeals Federal Circuit

No. 93-1558

Decided August 26, 1994

32 F3d 1579

Headnotes

PATENTS

[1] Patentability/Validity -- Anticipation -- In general (▶ 115.0701)

Patentability/Validity -- Obviousness -- In general (▶ 115.0901)

Board of Patent Appeals and Interferences erred, in upholding rejection of claims for data processing system under 35 USC 102(e) and 103, by analogizing data structure and computer memory of claimed system to printed matter, since board improperly extended printed matter rejection to field of information stored in memory, and since prior cases involving printed matter have no factual relevance if invention requires that information be processed by computer rather than human mind.

[2] Patentability/Validity -- Anticipation — Prior art (▶ 115.0703)

Patentability/Validity -- Obviousness -- Relevant prior art -- Particular inventions (▶ 115.0903.03)

Claims for data processing system are neither anticipated by, nor obvious in view of, prior patent for database management system, since claimed invention, which employs plurality of attribute data objects having both hierarchical and non-hierarchical relationships, involves organization of information and its interrelationships which reference neither discloses nor suggests.

Case History and Disposition

Page 1031

Appeal from the U.S. Patent and Trademark Office, Board of Patent Appeals and Interferences.

Patent application of Edward S. Lowry, serial no. 07/181,105 (data processing system having a data structure with a single, simple primitive). From decision upholding rejection of claims under 35 USC 102(e) and 103, applicant appeals. Reversed.

Attorneys

Barry N. Young, Maynard, Mass., and Denis G. Maloney, Lexington, Mass., for appellant.

Lee E. Barrett, associate solicitor, Fred E. McKelvey, solicitor, and Murriel E. Crawford, associate solicitor, PTO, for appellee.

Judge

Before Skelton, senior circuit judge, and Rich and Rader, circuit judges.

Opinion Text

Opinion By:

Rader, J.

Edward S. Lowry appeals the U.S. Patent and Trademark Office Board of Patent Appeals and Interferences' rejection of all claims in Patent Application Serial No. 07/181,105. On July 30, 1993, the Board *reversed* the rejection of claims 1 through 5 under 35 U.S.C. Section 101 (1988). The Board also *affirmed* the rejection of claims 1 through 19 under 35 U.S.C. Section 103 (1988) and claims 20 through 29 under 35 U.S.C. Section 102(e) (1988). This court reverses.

BACKGROUND

Lowry's patent application -- "Data Processing System Having a Data Structure with a Single, Simple Primitive" -- relates to the storage, use, and management of information residing in a memory. The PTO does not dispute the features and advantages of Lowry's claimed invention. The invention provides an efficient, flexible method of organizing stored data in a computer memory.

A memory stores data according to a particular order or arrangement. Application programs use stored data to perform specified functions. A data model provides the framework for organizing and representing information used by an application program. Data models define permissible data structures -- organizational structures imposed upon the data used by the application program -- compatible with particular data processing systems. Data structures are the physical implementation of a data model's organization of the data. Data structures are often shared by more than one application program.

The prior art contains data models and data structures. Prior art data models are generally one of two kinds: functionally expressive or structurally expressive data models. Functionally expressive data models enable complex nested operations using large blocks of data. These data models, however, are limited to a narrow class of applications and generally require more complex interfaces to functionality. Structurally expressive data models, on the other hand, define more varied data structures capable of representing accurately complex information. These data models, however, make complex nested operations on large blocks of data quite difficult.

Lowry's invention seeks to optimize both structural and functional expressiveness. Lowry discloses a data structure accessible by many different application programs. Lowry's data structure is based upon the "Attributive data model." The Attributive data model represents complex information in terms of attributes and relationships between attributes. According to Lowry's specification, " [a]n attribute expresses the idea that one thing is attributed to another thing." Thus, the Attributive data model capitalizes on the concept that a database is a collection of attributions, whereby information is represented in terms of its characteristics and relationships to other information.

In accordance with the Attributive data model, Lowry's data structure comprises a plurality of attribute data objects (ADOs) stored in memory. An ADO is a single primitive data element "compris [ing] sequences of bits which are stored in the memory as electrical (or magnetic) signals that represent information." It contains information used by the application program and information regarding its relationship with other ADOs. Lowry asserts that his data structure is functionally expressive by virtue of its representation of information in terms of attributes. Lowry also states that " [s]tructural expressiveness is achieved by making that primitive data object extremely simple and allowing for highly unconstrained interconnections between attribute instances."

According to the claimed invention, ADOs have both hierarchical and non-hierarchical interrelationships. A few specific rules govern these relationships. Because the claimed invention uses single ADOs governed by simple organizational rules, Lowry asserts that it may flexibly and accurately represent complex objects and relationships. The hierarchical relationships form a conceptual pyramidal structure. Hierarchical correlations describe "holding" or "being held" relationships. An ADO can "hold" one or more other ADOs. Each ADO, however, can "be held" by only one other ADO. Thus, while capable of holding many others, an ADO can be held by only one other ADO. One ADO, called the apex ADO, holds at least one other ADO but is held by no other ADO. This apex ADO is the only ADO that lacks a being-held relationship. From the apex ADO, the hierarchical relationships fan out in a pyramidal structure.

ADOs also have non-hierarchical relationships. These are essentially "pointing" relationships between ADOs. There are two basic types of ADOs: (1) element data objects, which refer to only themselves, and (2) relation data objects, which refer to one other ADO, called a referent ADO. A referent

Page 1033

ADO is merely an ADO that a relation data object refers to. Each ADO can be a referent ADO for more than one ADO. According to Lowry's specification, this arrangement of hierarchically and non-hierarchically related single primitive ADOs facilitates software operations such as retrieval, addition, and removal of information in the data structure.

Claims 1 through 5 claim a memory containing a stored data structure. Claim 1 is representative:

> 1. A memory for storing data for access by an application program being executed on a data processing system, comprising:
>
> a data structure stored in said memory, said data structure including information resident in a database used by said application program and including:

a plurality of attribute data objects stored in said memory, each of said attribute data objects containing different information from said database;

a single holder attribute data object for each of said attribute data objects, each of said holder attribute data objects being one of said plurality of attribute data objects, a being-held relationship existing between each attribute data object and its holder attribute data object, and each of said attribute data objects having a being-held relationship with only a single other attribute data object, thereby establishing a hierarchy of said plurality of attribute data objects;

a referent attribute data object for at least one of said attribute data objects, said referent attribute data object being nonhierarchically related to a holder attribute data object for the same at least one of said attribute data objects and also being one of said plurality of attribute data objects, attribute data objects for which there exist only holder attribute data objects being called element data objects, and attribute data objects for which there also exist referent attribute data objects being called relation data objects; and

an apex data object stored in said memory and having no being-held relationship with any of said attribute data objects, however, at least one of said attribute data objects having a being-held relationship with said apex data object.

Claims 6 through 19 claim a data processing system executing an application program, containing a database, a central processing unit (CPU) means for processing the application program, and a memory means for holding the claimed data structure. Claims 20-23, 25, and 28 specify methods of accessing, creating, adding, and erasing ADOs within the data structure. Claim 24 specifies a method for creating a data structure. Claims 26, 27, and 29 claim methods of creating and erasing non-hierarchical relationships between ADOs and referent ADOs.

THE PROCEEDINGS BEFORE THE PATENT AND TRADEMARK OFFICE

The examiner rejected claims 1 through 5 under 35 U.S.C. Section 101 as non-statutory subject matter. The examiner also rejected claims 1 through 19 under 35 U.S.C. Section 103 as obvious in light of U.S. Patent No. 4,774,661 (Kumpati). Finally, the examiner rejected claims 20 through 29 under 35 U.S.C. Section 102(e) as anticipated by Kumpati.

The Board *reversed* the 35 U.S.C. Section 101 rejection. The Board found that claims 1 through 5, directed to a memory containing stored information, as a whole, recited an article of manufacture. The Board concluded that the invention claimed in claims 1 through 5 was statutory subject matter.

When evaluating patentability under sections 102 and 103, the Board failed to give patentable weight to the claimed data structure. The Board stated that the claims on appeal specify relationships between the ADOs stored in the memory. The Board analogized Lowry's data structure comprised of ADOs to printed matter and relied on this statement from *In re Gulack* , 703 F.2d 1381, 217 USPQ 401 (Fed.Cir. 1983):

> Where the printed matter is not functionally related to the substrate, the printed matter will not distinguish the invention from the prior art in terms of patentability. Although the printed

matter must be considered, in that situation it may not be entitled to patentable weight.

Id . at 1385.

In *Gulack* , this court concluded that "the critical question is whether there exists any new and unobvious functional relationship between the printed matter and the substrate." *Id* . at 1386 (footnote omitted). The Board therefore framed the question as whether a new, nonobvious functional relationship exists between the printed matter (data structure with ADOs) and the substrate (memory). The Board determined that Lowry did not show such a functional relationship. Thus, the Board agreed with the examiner that the data structure could not distinguish the claimed invention from the prior art. The Board held that Kumpati, disclosing a CPU using a memory and containing stored data in a data structure, rendered

Page 1034

all claims either anticipated or obvious. Lowry appealed.

DISCUSSION

This court reviews the Board's determination of obviousness *de novo. In re Woodruff* , 919 F.2d 1575, 1577, 16 USPQ2d 1934, 1935 (Fed.Cir. 1990). This court reviews factual findings underlying the obviousness determination for clear error. *Id* . Whether a prior art reference anticipates the claimed invention is a question of fact reviewed under the clearly erroneous standard. *In re King* , 801 F.2d 1324, 1326, 231 USPQ 136, 138 (Fed.Cir. 1986).

The Patent and Trademark Office (PTO) must consider all claim limitations when determining patentability of an invention over the prior art. *Gulack* , 703 F.2d at 1385. The PTO may not disregard claim limitations comprised of printed matter. *See Gulack* , 703 F.2d at 1384; *see also Diamond v. Diehr* , 450 U.S. 175, 191 [209 USPQ 1] (1981). This court in *Gulack* , however, would not give patentable weight to printed matter absent a new and unobvious functional relationship between the printed matter and the substrate. The Board in this case determined that Lowry's data structures were analogous to printed matter and therefore the specific features of the constituent ADOs deserved no patentable weight without a functional printed matter-substrate relationship. Finding no such functional relationship between the ADOs and the memory, the Board refused to consider the specific data structure limitations.

[1] As an initial matter, this court notes that *Gulack* cautioned against a liberal use of "printed matter rejections" under section 103:

> A "printed matter rejection" under Section 103 stands on questionable legal and logical footing. Standing alone, the description of an element of the invention as printed matter tells nothing about the differences between the invention and the prior art or about whether that invention was suggested by the prior art. . . . [The Court of Customs and Patent Appeals], notably weary of reiterating this point, clearly stated that printed matter may well constitute structural limitations upon which patentability can be predicated.

Gulack , 703 F.2d at 1385 n.8. Despite this cautioning, the Board erroneously extended a printed matter rejection under sections 102 and 103 to a new field in this case, which involves information stored in a memory. This case, moreover, is distinguishable from the printed matter cases. The printed matter cases "dealt with claims defining as the invention certain novel arrangements of printed lines or characters, useful and intelligible only to the human mind." *In re Bernhart* , 417 F.2d 1395, 1399, 163 USPQ 611, 615 (CCPA 1969). The printed matter cases have no factual relevance where "the invention as defined by the claims *requires* that the information be processed not by the mind but by a machine, the computer." *Id* . (emphasis in original). Lowry's data structures, which according to Lowry greatly facilitate data management by data processing systems, are processed by a machine. Indeed, they are not accessible other than through sophisticated software systems. The printed matter cases have no factual relevance here.

Nor are the data structures analogous to printed matter. Lowry's ADOs do not represent merely underlying data in a database. ADOs contain both information used by application programs and information regarding their physical interrelationships within a memory. Lowry's claims dictate how application programs manage information. Thus, Lowry's claims define functional characteristics of the memory.

Contrary to the PTO's assertion, Lowry does not claim merely the information content of a memory.

Lowry's data structures, while including data resident in a database, depend only functionally on information content. While the information content affects the exact sequence of bits stored in accordance with Lowry's data structures, the claims require specific electronic structural elements which impart a physical organization on the information stored in memory. Lowry's invention manages information. As Lowry notes, the data structures provide increased computing efficiency.

Indeed, Lowry does not seek to patent the Attributive data model in the abstract. Nor does he seek to patent the content of information resident in a database. Rather, Lowry's data structures impose a physical organization on the data.

In Lowry's invention, the stored data adopt no physical "structure" per se. Rather, the stored data exist as a collection of bits having information about relationships between the ADOs. Yet this is the essence of electronic Structure. In *Bernhart* , this court's predecessor noted:

> There is one further rationale used by both the board and the examiner, namely, that the provision of new signals to be stored by the computer does not make it a new machine, i.e. it is *structurally* the same, no matter how new, useful and unobvious the result. . . . To this question we say that if a machine is programmed in a certain new and unobvious way, it is physically different from the machine without that program; its memory elements are differently arranged. The fact that these physical changes are invisible to the eye should not tempt us to conclude that the machine has not been changed.

Bernhart , 417 F.2d at 1400 (emphasis added).

More than mere abstraction, the data structures are specific electrical or magnetic structural elements in a memory. According to Lowry, the data structures provide tangible benefits: data stored in accordance with the claimed data structures are more easily accessed, stored, and erased. Lowry further notes that, unlike prior art data structures, Lowry's data structures simultaneously represent complex data accurately and enable powerful nested operations. In short, Lowry's data structures are physical entities that provide increased efficiency in computer operation. They are not analogous to printed matter. The Board is not at liberty to ignore such limitations.

Even assuming, arguendo, that data objects and data structures are analogous to printed matter, the Board erred in its reliance on *Gulack* . As part of its burden to establish a *prima facie* case of obviousness, *see In re Oetiker* , 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed.Cir. 1992), the burden of establishing the absence of a novel, nonobvious functional relationship rests with the PTO. "If examination at the initial stage does not produce a *prima facie* case of unpatentability, then without more the applicant is entitled to grant of the patent." *Id* . The PTO did not establish that the ADOs, within the context of the entire claims, lack a new and nonobvious functional relationship with the memory. The ADOs follow a particular sequence that enables more efficient data processing operations on stored data. The ADOs facilitate addition, deletion, and modification of information stored in the memory. In sum, the ADO's perform a function. *Gulack* requires no more. *See Gulack* , 703 F.2d at 1386.

With the foregoing in mind, this court now turns to the specific prior art rejections. The Board rejected claims 1 through 19 under section 103 as obvious over Kumpati. The Board found that claims 20-29 were anticipated by Kumpati. Claims 1 through 19 include a memory, comprising the claimed data structure, for storing data for access by an application program. Claims 20 through 29 describe methods of performing data management operations with respect to the claimed data structure.

The Kumpati patent, entitled "Database Management System with Active Data Dictionary," discloses a database management system containing an active data dictionary that the user can access and modify. Kumpati's data dictionary contains information about the structure and usage of the data stored in the database management system.

Kumpati discloses a data model within a database management system complete with hierarchical and relational interrelationships. Kumpati further defines an "attribute" as a "function that maps an entity set or relationship set into one or more value sets." A value set, in turn, "further identifies (or defines) the entity by populating these attributes with specific items of data which define these characteristics."

[2] Kumpati does not, however, disclose Lowry's ADOs and their specific hierarchical and non-hierarchical relationships. More specifically, Kumpati does not disclose the claimed pyramidal arrangement of hierarchically arranged ADOs, complete with apex ADO. Kumpati's relationship sets

are different from Lowry's relation data objects, having non-hierarchical relationships with other ADOs. Neither are Kumpati's "attributes," performing a mapping function, equivalent to Lowry's ADOs, containing information used by the application program as well as information regarding its interrelationships with other ADOs.

Lowry's claimed invention involves an organization of information and its interrelationships which Kumpati neither discloses nor suggests. Kumpati also does not render Lowry's claims obvious. The Board erred in holding otherwise. Claims 1 through 19 are, as a whole, not obvious in light of Kumpati.

Because Kumpati does not contain all limitations of claims 20 through 29, the Board erred in holding these claims anticipated by Kumpati. Therefore, this court reverses the section 102 rejection of claims 20 through 29.

CONCLUSION

The Board erred by denying patentable weight to Lowry's data structure limitations. This court reverses the Board's determination that claims 1 through 19 are obvious. This court also reverses the Board's decision that claims 20 through 29 are anticipated under section 102. *REVERSED.*

- End of Case -

ISSN 1526-8535

35 USPQ2d 1383

In re Beauregard

U.S. Court of Appeals Federal Circuit

No. 95-1054

Decided May 12, 1995

53 F3d 1583

Headnotes

PATENTS

[1] Patent grant -- Inventions patentable (► 105.05)

Patentability/Validity -- Subject matter (► 115.05)

Decision of Board of Patent Appeals and Interferences rejecting applicants' computer program product claims on basis of printed matter doctrine is vacated, since Patent and Trademark Office now states that computer programs embodied in tangible medium, such as floppy diskettes, are patentable subject matter under 35 USC 101 and must be examined under 35 USC 102 and 103.

Case History and Disposition

Page 1383

Appeal from the U.S. Patent and Trademark Office, Board of Patent Appeals and Interferences.

Patent application of Gary M. Beauregard, Larry K. Loucks, Khoa Dang Nguyen

Page 1384

and Robert J. Urquart. From decision upholding rejection of application claims, applicants appeal. On motion of Patent and Trademark Office to dismiss appeal for lack of subject matter jurisdiction. Vacated and *remanded*.

Attorneys

Nancy J. Linck, solicitor, Albin F. Drost, deputy solicitor, and Richard Torczon, associate solicitor, for PTO.

Robert Greene Sterne, of Sterne, Kessler, Goldstein & Fox, Washington, D.C., for appellant.

Opinion Text

Opinion By:

Archer, C.J. *ORDER*

The Commissioner of Patents and Trademarks moves to dismiss Gary M. Beauregard et al.'s appeal. Beauregard responds stating that vacature or reversal of the Board of Patent Appeals and Interferences' decision and remand to the Board is the appropriate disposition. Beauregard requests that the remand order be issued as a precedential order.

[1] Briefly, on August 4, 1994, the Board rejected Beauregard's computer program product claims

on the basis of the printed matter doctrine. Beauregard appealed. The Commissioner now states "that computer programs embodied in a tangible medium, such as floppy diskettes, are patentable subject matter under 35 U.S.C. Section 101 and must be examined under 35 U.S.C. Sections 102 and 103." The Commissioner states that he agrees with Beauregard's position on appeal that the printed matter doctrine is not applicable. Thus the parties are in agreement that no case or controversy presently exists.

Accordingly,

IT IS ORDERED THAT:

The Board's decision is vacated and the case is *remanded* for further proceedings in accordance with the Commissioner's concessions.

- End of Case -

ISSN 1526-8535

system

47 entries found for **system**. The first 10 are listed below.
To select an entry, click on it. For more results, click here.

system
ABO system
autonomic nervous system
Bertillon system
binary system
buddy system

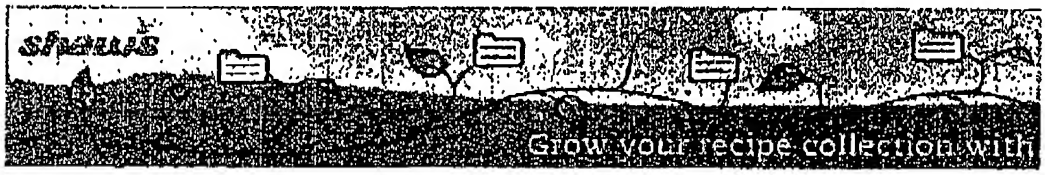
Go

Main Entry: **sys·tem**
Pronunciation: 'sis-t&m
Function: *noun*
Etymology: Late Latin *systemat-, systema,* from Greek *systEmat-, systEma,* from *synistanai* to combine, from *syn-* + *histanai* to cause to stand -- more at STAND
1 : a regularly interacting or interdependent group of items forming a unified whole <a number *system*>: as **a** (1) : a group of interacting bodies under the influence of related forces <a gravitational *system*> (2) : an assemblage of substances that is in or tends to equilibrium <a thermodynamic *system*> **b** (1) : a group of body organs that together perform one or more vital functions <the digestive *system*> (2) : the body considered as a functional unit **c :** a group of related natural objects or forces <a river *system*> **d :** a group of devices or artificial objects or an organization forming a network especially for distributing something or serving a common purpose <a telephone *system*> <a heating *system*> <a highway *system*> <a computer *system*> **e :** a major division of rocks usually larger than a series and including all formed during a period or era **f :** a form of social, economic, or political organization or practice <the capitalist *system*>
2 : an organized set of doctrines, ideas, or principles usually intended to explain the arrangement or working of a systematic whole <the Newtonian *system* of mechanics>
3 a : an organized or established procedure <the touch *system* of typing> **b :** a manner of classifying, symbolizing, or schematizing <a taxonomic *system*> <the decimal *system*>
4 : harmonious arrangement or pattern : ORDER <bring *system* out of confusion -- Ellen Glasgow>
5 : an organized society or social situation regarded as stultifying or oppressive : ESTABLISHMENT 2 -- usually used with *the*

synonym see METHOD
- sys·tem·less /-l&s/ *adjective*

Learn more about "system" and related topics at Britannica.com

Find more about "system" instantly with Live Search



section

14 entries found for **section**. The first 10 are listed below.
To select an entry, click on it. For more results, click here.

section[1,noun]
section[2,verb]
caesarean section
cesarean section
conic section
cross section

Go

Main Entry: **[1]sec·tion**
Pronunciation: 'sek-sh&n
Function: *noun*
Etymology: Latin *section-, sectio,* from *secare* to cut -- more at SAW
1 a : the action or an instance of cutting or separating by cutting **b :** a part set off by or as if by cutting
2 : a distinct part or portion of something written (as a chapter, law, or newspaper)
3 a : the profile of something as it would appear if cut through by an intersecting plane **b :** the plane figure resulting from the cutting of a solid by a plane
4 : a natural subdivision of a taxonomic group
5 : a character § used as a mark for the beginning of a section and as a reference mark
6 : a piece of land one square mile in area forming especially one of the 36 subdivisions of a township
7 : a distinct part of a territorial or political area, community, or group of people <the historic *section* of the city>
8 a : a part that may be, is, or is viewed as separated <a board cut into *sections*> <the northern *section* of the route> **b :** one segment of a fruit : CARPEL
9 : a basic military unit usually having a special function
10 : a very thin slice (as of tissue) suitable for microscopic examination
11 a : one of the classes formed by dividing the students taking a course **b :** one o: the discussion groups into which a conference or organization is divided
12 a : a part of a permanent railroad way under the care of a particular crew **b :** one of two or more vehicles or trains which run on the same schedule
13 : one of several component parts that may be assembled or reassembled <a bookcase in *sections*>

14 : a division of an orchestra composed of one class of instruments <the string *section*>

15 : SIGNATURE 3b

synonym see PART

Physician-reviewed articles on **section** on Healthline.
1. C section (3 images)
A C-section, also called a cesarean section, is the deliv...

Visually explore **section** HealthMaps on Healthline:

1. Delivery of Baby
2. All About Breast-Feeding

Learn more about "section" and related topics at Britannica.com

Find more about "section" instantly with Live Search

Pronunciation Symbols